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Report 215



Gahi-2 Hybrid Millet



Seed Production in the
Salt River Valley

AGRICULTURAL EXPERIMENT STATION

The University of Arizona

Tucson, Arizona

June 1963

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Robert L. Voigt¹

A planting was made in 1962 at the Cotton Research Center, Phoenix, for trial production of Gahi-2 hybrid millet seed under conditions in the Salt River Valley of Arizona. Gahi-2 is produced in a manner similar to that used for Gahi-1, namely from a mixture of four inbred lines. The inbred lines and the system of hybrid production² were developed by Dr. Glenn W. Burton, Geneticist, USDA-ARS, Tifton, Georgia.

Planting rates of two and four pounds of seed per acre were tested on single and double row beds. The double row treatment was planted in two rows 12 inches apart on 40 inch beds and the single row treatment was planted one row per bed. Each treatment was applied to four-bed plots 50 feet long. Treatments were replicated eight times. Only the center two beds were harvested for yield.

Hybrid seed production figures under the four management treatments are given in Table 1.

There were no significant statistical differences among treatments; however, the average yields of the two pounds per acre seeding rates were slightly higher than the yields of the four pounds per acre rates. Single or double rows per bed did not influence yield in this trial.

Bird damage occurred before harvest could be completed. The birds appeared to feed evenly over the field so a uniform damage rate was assumed.

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²Burton, Glenn W. The performance of various mixtures of hybrid pearl millet, *Pennisetum glaucum* (L) R. Br. J. Am. Soc. Agron. 40:908-915. 1948.

Furthermore, the actual yield plots were in the center of a five acre field eliminating the usual more serious damage near the edge of the field. Bird losses were estimated to be about 50 per cent indicating a possible seed production of 1500 to 2000 pounds per acre.

Lodging was never a serious problem in this trial but there was an apparent difference in lodging between single and double-row plots with higher lodging in the double-row plots. The different planting rates did not appear to influence lodging.

The four inbred lines were also grown alone for data on growth and development and also to obtain yield information. Table 2 gives the observed data on growth and development of the four inbred lines. Inbred line Number 241 was the earliest to reach anthesis and line Number 240 was the latest. The four inbreds flowered fairly close together as desired except for inbred Number 241 in this particular trial. These four lines have coincided in anthesis quite well in Georgia.

A yield test of the four inbreds was conducted using 40 inch, single row beds, four-bed plots, 50 feet long, replicated four times, and seeded at a rate of three pounds per acre. The center two rows were harvested for seed yield. These yields in pounds per acre and the lodging per cents observed for each inbred line are given in Table 3. There were considerable differences in observed yields among the inbreds. One inbred line, Number 241, lodged badly by breaking over below the head as illustrated in Figure 1. There was no apparent insect damage or disease in the peduncle or stalk of inbred Number 241 to account for the lodging which would indicate just a weak stalk. It was necessary to harvest with a low combine setting in an attempt to save most heads; however, some heads on lodged plants were not picked up by the combine which may account in part for the low seed yield of inbred Number 241.

The plantings of these trials were delayed by land preparation difficulties until July 19, 1962. A more desirable planting date may have been about one month earlier, however, the delay was not serious.

The relative sizes of the mature seed heads of the four inbreds are shown in Figure 2.

Table 1. Average Seed Yields and Per Cent Lodging in Gahi-2 Hybrid Millet
Seed Production Trial. Phoenix, Arizona. 1962.

Method of Planting	Yield in Pounds per Acre	Per Cent Lodging
2 lbs/acre in single row/bed	938	10
2 lbs/acre in double row/bed	909	16
4 lbs/acre in single row/bed	849	11
4 lbs/acre in double row/bed	889	19

Table 2. Observations on Four Inbred Lines of Pearl Millet, Used in the Production of Gahi-2, When Grown Alone.
Phoenix, Arizona, 1962.

Inbred ¹	Date of First Emergence From Boot	Heading Completed	Beginning Anthesis	Anthesis Complete	10-24-62 Observation	Average Height to Top of Head	Lodging 12-12-62	Comments
Number 238:	20 Sept.	**	26 Sept.	10 Oct.	Milk	50"	5-10%	Wide Leaf, 9" heads
Number 239:	19 Sept.	28 Sept.	25 Sept.	8 Oct.	Soft-Hard Dough	48"	None	Narrow Leaf, 6" heads
Number 240:	21 Sept.	29 Sept.	1 Oct.	14 Oct.	Very Early Milk	67"	5-10%	Wide Leaf, 8" heads Taller and later, probably would ferti- lize most receptive stigmas left on Lines 238, 239 and 241
Number 241:	15 Sept.	20 Sept.	**	29 Sept.	Hard Dough	51"	75-100%	Narrow Leaf, 10" heads, Lodged by breaking over 4-8 inches below head

¹Planted 19 July 1962.

**No observation made.

Table 3. Average Seed Yields and Per Cent Lodging of Inbred Lines Used
for Gahi-2 Hybrid Millet Seed Production,
Phoenix, Arizona. 1962.

Inbred Lines	:	Yield in Pounds per Acre	:	Per Cent Lodging
Number 238	:	1202	:	15
Number 239	:	1254	:	0
Number 240	:	810	:	0
Number 241	:	510	:	75 to 100



Figure 1. Typical Broken Peduncles in Inbred Number 241 which contributed to the high lodging score for this line.

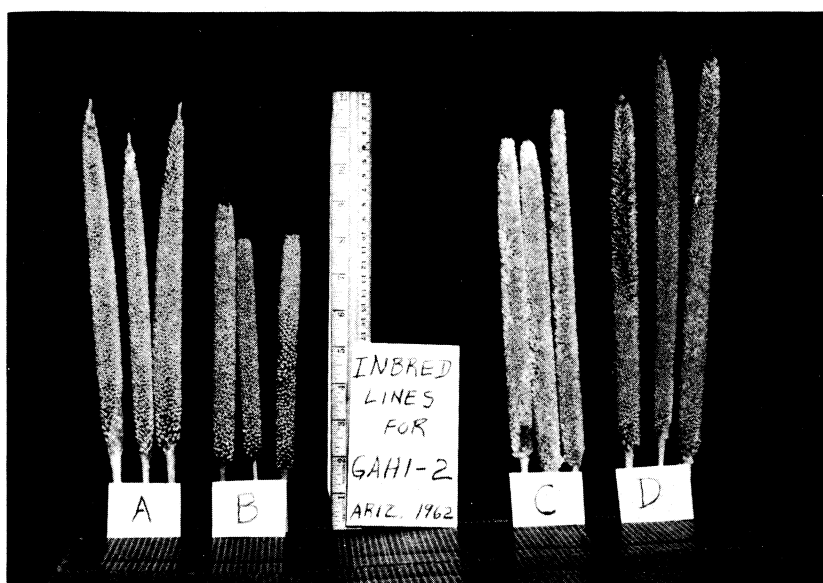


Figure 2. Typical Seed Heads of Inbred Lines Numbers 238, 239, 240, and 241 (Labeled A, B, C, and D respectively).